O I P E IAP88
SEP 0 6 2006
PATENT & TRADEMARK OFFICE

32692
Customer Number

Patent
Case No.: 58629US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: GROSS, CHRISTOPHER L.
Application No.: 10/680693 Group Art Unit: 1772
Filed: October 7, 2003 Examiner: William Watkins III
Title: NON-WHITE CONSTRUCTION SURFACE

DECLARATION OF JEFFRY L. JACOBS UNDER 37 CFR §1.132

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

I, Jeffry L. Jacobs, declare that:

1. I am a U.S. citizen and a resident of Stillwater, Minnesota.

2. I am employed by 3M Company as a Technical Manager in 3M Industrial Mineral Products Division.

3. I have read and understood U.S. Patent Application Serial No. 10/680,693, filed October 7, 2003, and titled NON-WHITE CONSTRUCTION SURFACE and the Office Action for U.S. Patent Application Serial No. 10/680,693 mailed May 31, 2006.

4. I understand that the Examiner has rejected claims 13, 15, 16, 17-19, and 27-28 under 35 USC 112, first paragraph, as failing to comply with the enablement requirement. The Examiner has asserted that the spreadsheet available from the Lawrence Berkley Laboratory is essential to the practice of the claims and is not readily available. U.S. Patent Application Serial

No. 10/680,693 provides a description of the method used to obtain direct solar reflectance values that is independent of the referenced spreadsheet available from the Lawrence Berkley Laboratory. The pending specification states that ASTM method G159 was used to compute interpolated irradiance data at 5 nm intervals in the region of interest, and this 5 nm data was used to create weighting factors by dividing the individual irradiances by the total summed irradiance from 300 to 2500 nm. The weighting factors were then multiplied by the experimental reflectance data taken at 5 nm intervals to obtain the direct solar reflectance at those wavelengths. Thus, the spreadsheet from the Lawrence Berkley Laboratory is not required to obtain the direct solar reflectance values.

5. I understand that the Examiner has rejected claims 1-4, 7-10, 15-19, and 22-28 under 35 USC 103(a) as being unpatentable over Sloan (U.S. 3,479,201) in view of Sliwinski et al., (U.S. 6,454,848). The Examiner states that Sloan teaches using precoats with titanium dioxide as a pigment to seal a granule and prevent staining and that it would have been obvious to have an IR reflective pigment in the outer layer of Sloan in order to achieve a desired color and have IR reflection because of the teachings of Sliwinski et al. As an individual of skill in the art, I do not believe that there would have been motivation at the time of the invention to combine these references.

6. In particular, preventing staining with Sloan's precoat was not the state of the art as of the filing date of U.S. Patent Application Serial No. 10/680,693. In addition, Sloan's stain preventing precoat is cost prohibitive in light of the state of the art stain preventing post-treatments. Thus, Sloan's stain preventing precoat would not have been utilized as of the filing date of U.S. Patent Application Serial No. 10/680,693. As of the filing date of U.S. Patent Application Serial No. 10/680,693 the state of the art for granule stain prevention was stain prevention post-treatments. Evidence of the state of the art for stain prevention includes the following stain prevention post-treatments patent listing:

1) Graham - US 5,286,544 - Oil and Rubber treated roofing granules – "The oil and rubber are applied to the roofing granules' surfaces as a thin film. The

thin film of oil and rubber impedes granule staining from oils in asphalt roofing materials..." (Abstract)

2) George et al. - US 5,240,760 - Polysiloxane Treated Roofing Granules - "An effective amount of the polysiloxane is applied to the roofing granules' surface in the post-treatment stage. It has been discovered that when roofing granules' surfaces are treated with a polysiloxane having a long chain hydrocarbon group, there is a significant reduction in adsorption of asphaltic oils on the granules' surfaces."

3) George et al. - US 5,362,566 - Coated Composition, Granules Coated with Same, and Methods of Reducing Dust Generation - "Silicone oils are typically used to promote the adhesion of roofing granules to asphalt - based substrates and to improve the stain resistance of the granules...." (column 7 line 16.)

4) George et al. - US 5,484,477 - Coated Composition, Granules Coated with Same, and Methods of Reducing Dust Generation - "Silicone oils are typically used to promote the adhesion of roofing granules to asphalt - based substrates and to improve the stain resistance of the granules...." (column 7 line 26.)

Thus, I believe that one of skill in the art would not have tried to prevent staining with Sloan's precoat in light of the state of the art stain preventing post-treatments utilized as of the filing date of U.S. Patent Application Serial No. 10/680,693.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so

made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 8/30/06

By:
Jeffry L. Jacobs

32692
Customer Number

OIPE IAP88
SEP 06 2006
PATENT & TRADEMARK OFFICE

Patent
Case No.: 58629US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: GROSS, CHRISTOPHER L.
Application No.: 10/680693 Group Art Unit: 1772
Filed: October 7, 2003 Examiner: William Watkins III
Title: NON-WHITE CONSTRUCTION SURFACE

DECLARATION OF DR. CHRISTOPHER L. GROSS UNDER 37 CFR §1.131

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

I, Christopher L. Gross PhD, declare that:

1. I am a U.S. citizen and a resident of Lake Elmo, Minnesota.

2. I am employed by 3M Company and I am an inventor of U.S. Patent Application Serial No. 10/680,693, filed October 7, 2003, and titled NON-WHITE CONSTRUCTION SURFACE.

3. I have read and understood the Office Action for U.S. Patent Application Serial No. 10/680,693 mailed May 31, 2006.

4. I have attached technical notebook page 10 from notebook number 130688 to provide evidence of conception of the claimed invention. The activity described in notebook number 130688, page 10 was carried out before 19 February 2003 in the United States of America.

5. I have attached technical notebook pages 11-19 from notebook number 130688 to provide evidence of reduction to practice of the claimed invention. The activity described in notebook number 130688, page 10 was carried out before 19 February 2003 in the United States of America.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 3/30/06

By:
Christopher L. Gross

Enclosure: Technical notebook pages 10-19, from notebook number 130688

OIPE IAP88
SEP 06 2006
PATENT & TRADEMARK OFFICE

PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

DO NOT WRITE IN THIS MARGIN

Potential Routes to IR reflective granules/shingles
IR – Infrared Reflecting

- Vary IR pigment loadings in granule coating formulations to determine optimal loading levels
    - Vary coating thicknesses with coatings containing IR pigments
- Apply multiple coatings to granules with 2nd(3rd) coating containing increased IR pigment loading (2nd coat may be thinner to optimally concentrate IR pigments)
    - Possibly utilize "standard" pigments in 1st coating with IR pigments in 2nd coating
- Develop methods to have pigments "bloom" to coating surface to reduce needed pigment amounts
- Combine IR reflective pigments with other transparent (in the visible) IR reflecting materials (fillers) in granule coating formulation
- Apply non-silicate coating containing IR pigments over granules either before or after the granules have been applied to shingle
- Embed IR reflective granules in an IR reflective film/adhesive on a shingle
- Vary granule size/shape to determine if these parameters affect reflectivity
- Coat rock fines with IR pigment silicate formulations and apply these to interstitial spaces on shingles
- Cover interstitial shingle spaces (between granules) with other IR reflective material (IR pigment coating, IR film, IR minerals, etc.)
- Blend IR-reflective granules with other less reflective granules to obtain average reflectivities that meet requirements
- Apply IR-reflective, visibly transparent film over granule-coated shingles
- Incorporate photocatalytic materials (TiO_2, ZnO, etc.) into formulations to minimize soot/dust/etc. accumulation
- Utilize other minerals as base rock for color properties (quartz [UV-problems?], other light colored minerals, etc.)

THE ABOVE LIST CONTAINS VARIOUS IDEAS FROM PEOPLE WITHIN THE IMP LAB REGARDING ACHIEVING IR ROOFING MATERIALS

AUTHOR'S FULL NAME or INITIALS ______ DATE: __

WITNESS'S FULL NAME or INITIALS RATG ______ DATE: ______
(READ AND UNDERSTOOD)

PROJECT NO. SUBJECT: DATE:

Objective: ENERGY-EFFICIENT GRANULES

Reference:

RM 11-Digit No.	RM Name	Target #/ton	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	40	40	20
	water	15	15	7.5
11-0002-6169-0	CR800 titanium dioxide	2.25	2.25	1.125
	Ferro 10411 Golden Yellow	2	2	1
11-0002-9619-1	Borax	2	2	1
11-0002-8183-9	Snobrite Clay	20	20	10
			81.25	40.625

"68"

RM 11-Digit No.	RM Name	Target #/ton	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	34	34	17
	water	15	15	7.5
	Ferro 10411 Golden Yellow	0.6	0.6	0.3
	Ferro 10241 Forest Green	7	7	3.5
11-0002-8183-9	Snobrite Clay	15	15	7.5
11-0002-9619-1	Borax	1	1	0.5
			72.6	36.3

"37"

THE TWO FORMULATIONS ABOVE WERE PREPARED ON A 2000g-of-GRANULES BASIS. THESE ROUGHLY APPROXIMATE THE FORMULATIONS FOR CORONA 37 + 68. THE FORMULATIONS WERE PREPARED TWICE EACH, ONE TO COVER RAW CORONA BASE ROCK 11-GRADE GRANULES + ONE TO COVER 93 WHITE CORONA KILN SAMPLES

FOR THE "68" SAMPLES, 31.5g OF FORMULATION WAS ADDED TO 1000g GRANULES (LESS THAN THE DESIRED 40.6g). FOR THE "37" SAMPLES, 36.5g OF THE FORMULATION WAS APPLIED TO 1000g GRANULES.

THE COATING PROCEDURE FOLLOWED + RESULTS ARE LOCATED ON THE SUBSEQUENT PAGES.

AUTHOR'S FULL NAME or INITIALS OJ DATE:

WITNESS'S FULL NAME or INITIALS DATE:

(READ AND UNDERSTOOD)

DO NOT WRITE IN THIS MARGIN

PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

DO NOT WRITE IN THIS MARGIN

Granule Coating Procedure

- Preheat 1000g granules to 200°F in oven or with heat gun
- Measure out sodium silicate solution (PQ PD sodium silicate 2.75 ratio) and water in Waring blender container.. Batch size should be larger than what is required for 1000g (For 2000g granules, 38-42 g PD Silicate and 15-20 g water are typical) because once all the materials are mixed, it is difficult to effectively remove all of the material from the blender container.
- Measure out clay and pigments in weighing boat as formulation requires (in subsequent addition to silicate solution, weighing out pigments on top of clay aids in flowability of powders)
- Separately, measure out borax (if necessary)
- Add clay and pigments (but not borax – will lead to "clumps") to Waring blender container which already contains the silicate solution and then cover the container
- Place covered container on Waring blender stand and mix for 20-30 seconds
- Stop blender, uncover and add pre-measured borax to container (if necessary) - Cover and mix for 20-30 additional seconds
- Weigh out appropriate amount of mixture in weighing boat for coverage of 1000g of granules
- Remove preheated granules from oven and place them in a mixing container (for mixers on west wall) – clean thoroughly before using as well as mixer blades
- Set kitchen timer to 4 minutes and start timer
- Add pre-weighed silicate/pigment/borax mixture to granules (while mixing) – while adding mixture to granules, agitate the granules with a spatula (1"wide, 6" long blade with wood handle) to aid coating coverage of granules (to remove remaining silicate from weighing boat, add a scoop of granules from the mixer to the weighing boat, mix them around a bit and then add back to mixer)
- After addition of silicate mixture, continue to work granules for another 1.5-2 minutes with the spatula to ensure homogeneous granule coverage
- With one minute remaining, position heat gun over mixing container and start heat gun (on cold setting) to effectively dry the granule coating. Stop mixer and gun when timer reaches zero.

AUTHOR'S FULL NAME or INITIALS ____________ DATE:

WITNESS'S FULL NAME or INITIALS ____________ DATE: ____________
(READ AND UNDERSTOOD)

PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

Firing Procedure (for operation of firing pots, see QSP-LAB-PROD-004 "Operating Instructions for Firing Pots")

- Ensure that pot is free of residues – pots can be blown out with air gun, or, for more vigorous cleaning, raw granules can be tumbled in pot with or without firing. The pots can also be wiped with a wet a paper towel.
- Heat pot with flame at 10% for 1-2 minutes, then turn off flame and move burner to the side
- Add coated granules to pot and move burner and thermocouple back into place
- With burner flame set at 20%, turn on burner – break up clinkers (clumps) during 1st minute with wand (located in firing room)
- When temperature reaches 300°F, change burner flame setpoint to 30%
- When temperature reaches desired maximum (860°F), turn flame off, move burner/thermocouple to side, and scrape out granules from firing pot (still turning) into a pan with a long-handled scraper
- Spread granules on a cooling slab located on the table opposite to the firing pots.

For granule post-treatment procedure (oil), see QSP-LAB-PROD-002 "Granule Treatment"

If pickling is required, see QSP-LAB-PROD-005 "Pickling - solution preparation and application"

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(READ AND UNDERSTOOD)

PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

		L*	A	B
EE68C D		54.17	-1.23	15.06
EE68C C		54.06	-1.15	15.25
EE68C B		54.41	-1.17	15.06
EE68C A		54.88	-1.19	15.27
	Average	54.38	-1.185	15.16
EE68C (93C BASE) D		68.48	-0.3	21.69
EE68C (93C BASE) C		68.41	-0.31	21.72
EE68C (93C BASE) B		68.68	-0.3	21.71
EE68C (93C BASE) A		68.37	-0.27	21.8
	Average	68.485	-0.295	21.73
EE37C D		42.94	-7.48	10.76
EE37C C		42.79	-7.41	10.68
EE37C B		42.75	-7.46	10.77
EE37C A		42.75	-7.41	10.69
	Average	42.8075	-7.44	10.725
EE37C (93 BASE) D		55.91	-8.64	12.43
EE37C (93 BASE) C		55.61	-8.62	12.41
EE37C (93 BASE) B		55.98	-8.61	12.48
EE37C (93 BASE) A		56.09	-8.61	12.49
	Average	55.8975	-8.62	12.4525
CORONA 93 D		68.6	-0.45	1.23
CORONA 93 C		68.88	-0.47	1.26
CORONA 93 B		68.64	-0.46	1.23
CORONA 93 A		68.86	-0.44	1.34
	Average	68.745	-0.455	1.265

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WITNESS'S FULL NAME or INITIALS ____________ DATE: ________

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PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

Internal Correspondence

3M

TO	Chris Gross	201-1W-14	☎ 736-4371
FROM:	Mark E. Mueller John Zietlow 3M Corporate Analytical Technology Center	201-1S-26	☎ 733-2338

REGARDING: **Total (and Diffuse) Solar Reflectance – G72879 Final Report**

Samples:

Four experimental roofing granule samples, one standard sample

Method:

Measurements were made on a Perkin Elmer Lambda 900 Spectrophotometer fitted with a PELA-1000 integrating sphere accessory. This sphere is 150 mm (6 inches) in diameter and complies with ASTM methods E903, D1003, E308, *et al.* as published in "ASTM Standards on Color and Appearance Measurement", Third Edition, ASTM, 1991. Total and Diffuse Luminous Reflectance (TLR and DLR) were measured over the spectral range of 250-2500nm. See figure 1

Measurements were all made with a clean and optically flat fused silica (quartz) plate in front of the sample, in front of the standard white plate, or in front of a light trap

TLR measurements were corrected as follows:

$$\% TLR_{sample} = 100 * (R_{measured} - R_{trap}) / (R_{white\ plate} - R_{trap})$$

$R_{measured}$ = Raw total luminous reflectance of sample

$R_{white\ plate}$ = Raw total luminous reflectance of white plate

R_{trap} = Raw total luminous reflectance of trap

DLR measurements were not corrected, but the specular component is trapped out (see figure below). This assumes that the granules are nearly diffuse reflectors and the quartz plate reflectance is solely specular. These measurements are in very good agreement with %TLR.

Results and Discussion:

Data for 250-2500nm is presented in the attached Excel™ file. Please call with any questions

Page 2 of 3

Lambda 900 Experimental Parameters:

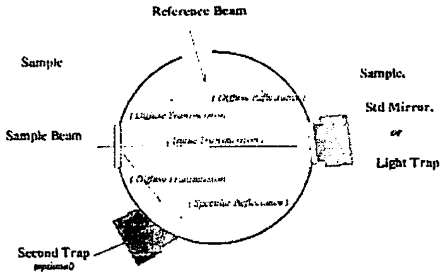
Parameters:

Scan Speed:	Approx. 240 nm/min
UV-Vis Integration:	0.44s
Data Interval	2 nm
Slit Width:	4 nm
Mode	% Reflectance

Data recorded from 250-2500 nm.

Instrument ID:

Perkin Elmer Lambda 900 -- # BV900ND0	Ser. No. 101N112040
Lab Sphere PELA-1000 Accessory	Ser. No. AS-01034-060



Experimental Diagram:

Figure 1a -- *Front sample position, measuring Total %T (white plate, TLT) Diffuse % T (light trap, DLT) of sample*

Figure 1b -- *Rear sample position, measuring Total %R (TLR) all light reflected by sample placed at the back of the integrating sphere in front of a light trap*

Specular Removed in Measurement (open port in sphere)

Air Mass 1.5 Hemispherical 37 Deg. Solar Reflectivities

37EEC (93BC)	68EEC (93BC)	37EEC	68EEC	Standard Green
27.92	33.84	14.48	18.54	8.17

Air Mass 1.5 Direct Normal 37 Deg Solar Reflectivities

37EEC (93BC)	68EEC (93BC)	37EEC	68EEC	Standard Green
28.98	34.44	14.98	18.66	8.45

Specular Subtracted

Air Mass 1.5 Hemispherical 37 Deg. Solar Reflectivities

37EEC #1 (Total)	68EEC (93BC)	68EEC #1 (Total)	37EEC (93BC) #2 (Total)
~~27.33~~ 14.76	32.72 ~~32.72~~ ~~27.33~~	~~14.76~~ 18.69	~~18.69~~ 37.33

Air Mass 1.5 Direct Normal 37 Deg Solar Reflectivities

37EEC #1 (Total)	37EEC (93BC)	68EEC #1 (Total)	68EEC (93BC) #2 (Total)
15.30	28.45	18.91	33.32

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NOTEBOOK NO. 130688 PAGE 16

PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

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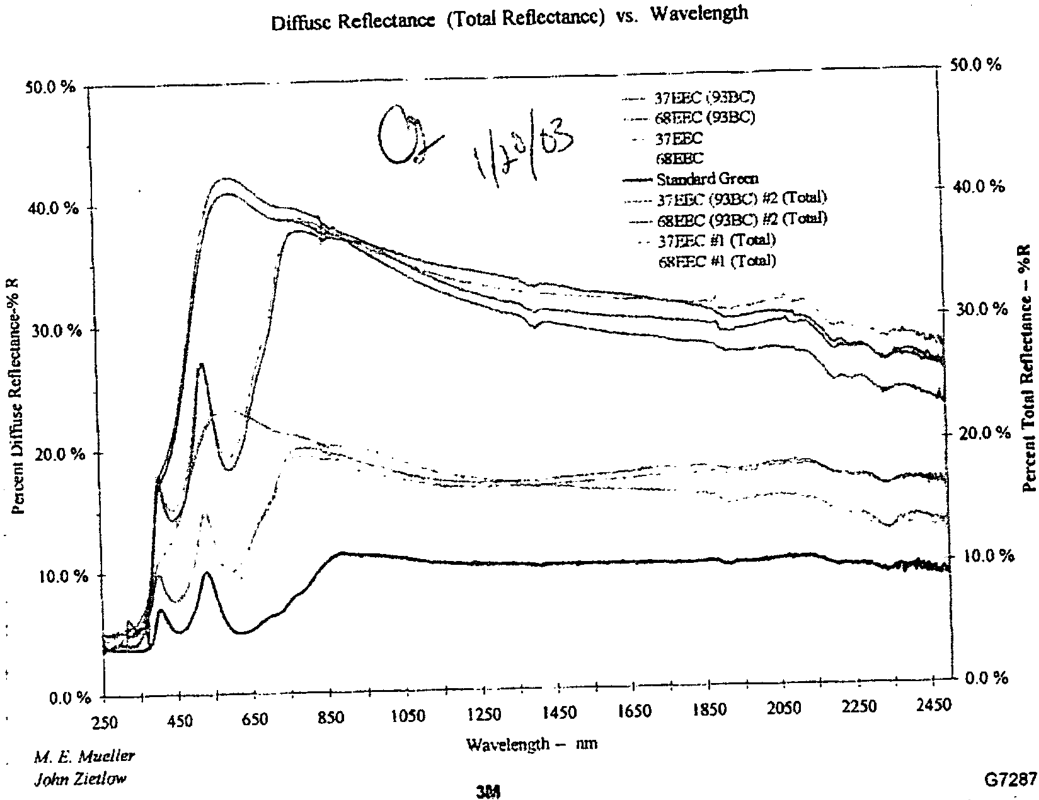


CJ 1/20/03

M. E. Mueller
John Zietlow

3M

G72879

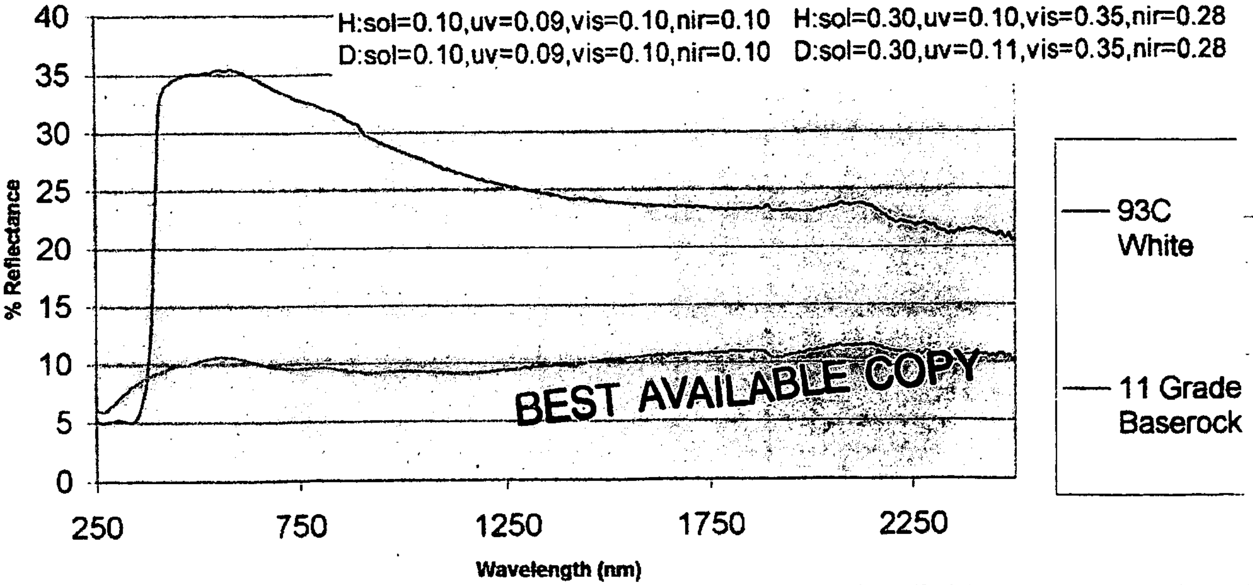
- Solar Reflectance data below calculated using raw data from PE 2900 & calculator from R. Levinson @ Lawrence Berkeley

Corona 93 White and Baserock Reflectance

CJ

CORONA 11 GRADE BASEROCK
H:sol=0.10,uv=0.09,vis=0.10,nir=0.10
D:sol=0.10,uv=0.09,vis=0.10,nir=0.10

CORONA 93 WHITE
H:sol=0.30,uv=0.10,vis=0.35,nir=0.28
D:sol=0.30,uv=0.11,vis=0.35,nir=0.28



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WITNESS'S FULL NAME or INITIALS DATE:
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NOTEBOOK NO. 130688 PAGE 17

PROJECT NO. SUBJECT: DATE:

Objective:

Reference:

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68 EEC (93BC) 2X

RM 11-Digit No.	RM Name	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	40	20
	water	15	7.5
11-0002-6169-0	CR800 titanium dioxide	4.5	2.25
	Ferro 10411 Golden Yellow	4	2
11-0002-9619-1	Borax	1	0.5
11-0002-8183-9	Snobrite Clay	20	10
		84.5	42.25

CM

37 EEC (93BC) 2X

RM 11-Digit No.	RM Name	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	34	17
	water	15	7.5
	Ferro 10411 Golden Yellow	1.2	0.6
	Ferro 12650 Camo (Hi IR) Green	14	7
11-0002-8183-9	Snobrite Clay	15	7.5
11-0002-9619-1	Borax	1	0.5
		80.2	40.1

41 EEC (93BC)

RM 11-Digit No.	RM Name	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	39	19.5
	water	17	8.5
	10550 Brown	8	4
	10415 Golden Yellow	0.6	0.3
11-0002-8183-9	Snobrite Clay	12.5	6.25
		77.1	38.55

51 EEC (93BC)

RM 11-Digit No.	RM Name	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	38	19
	water	19	9.5
	10202 Black	6	3
11-0002-8183-9	Snobrite Clay	20	10
		83	41.5

71 EEC (93BC) 2X

RM 11-Digit No.	RM Name	Grams 2000g	Grams 1000g
11-0000-7234-5	PD sodium silicate	40	20
	water	15	7.5
	10202 Black	1	0.5
11-0002-6169-0	CR800 titanium dioxide	0.6	0.3
	Ferro 10241 Forest Green	2.5	1.25
	10550 Brown	1.6	0.8
11-0002-8183-9	Snobrite Clay	15	7.5
		75.7	37.85

- THE FOLLOWING FORMULATIONS WERE PREPARED AS DESCRIBED ON P. 12 OF THIS NB. THE FORMULATIONS WERE APPLIED (IN THE AMOUNTS APPROPRIATE FOR 1 KG OF MINERAL) TO 93 WASTE KILN MATERIAL FROM CORONA (~~[illegible]~~ ~~TO~~, MADE ON , FIRED AS ON P. 13 OF THIS NB

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AUTHOR'S FULL NAME or INITIALS DATE:

WITNESS'S FULL NAME or INITIALS DATE:
(READ AND UNDERSTOOD)

PROJECT NO.   SUBJECT: DATE:

Objective:

Reference:

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			L*	A	B
Sample 20	71EEC (93BC) 2X #4		50.87	1.28	6.4
Sample 19	71EEC (93BC) 2X #3		50.55	1.28	6.4
Sample 18	71EEC (93BC) 2X #2		51.04	1.27	6.39
Sample 17	71EEC (93BC) 2X #1		50.81	1.29	6.42
		Average	50.8175	1.28	6.4025
Sample 16	51EEC (93BC) #4		48.56	0.65	0.87
Sample 15	51EEC (93BC) #3		49.11	0.65	0.91
Sample 14	51EEC (93BC) #2		49.07	0.65	0.88
Sample 13	51EEC (93BC) #1		49.04	0.65	0.89
		Average	48.945	0.65	0.8875
Sample 12	37EEC (93BC) 2X #4		46.67	-5.97	12.28
Sample 11	37EEC (93BC) 2X #3		46.83	-5.96	12.29
Sample 10	37EEC (93BC) 2X #2		46.95	-6	12.37
Sample 9	37EEC (93BC) 2X #1		47.08	-5.98	12.33
		Average	46.8825	-5.9775	12.3175
Sample 8	41EEC (93BC) #4		41.37	7.37	8.27
Sample 7	41EEC (93BC) #3		41.18	7.4	8.31
Sample 6	41EEC (93BC) #2		41.15	7.36	8.28
Sample 5	41EEC (93BC) #1		41.2	7.43	8.34
		Average	41.225	7.39	8.3
Sample 4	68EEC (98BC) 2X #4		68.25	1.06	26.96
Sample 3	68EEC (98BC) 2X #3		68.51	1.01	26.98
Sample 2	68EEC (98BC) 2X #2		68.78	0.99	26.9
Sample 1	68EEC (98BC) 2X #1		68.66	1	26.88
		Average	68.55	1.015	26.93

- SOLAR REFLECTIVITIES BELOW WERE CALCULAT USING ASTM G159 AIR MASS 1.5 SOLAR IRRADIANCE DATA TO "WEIGHT" THE RAW REFLECTIVITY DATA COLLECTED W/ 3M CATC PE 900 SPECTROMETER (250-2500 nm @ 2nm INTERVALS)

Specular Removed in Measurement (open port in sphere)

Air Mass 1.5 Hemispherical 37 Deg. Solar Reflectivities

37EEC (93BC) 2X	41EEC (93BC)	51EEC (93BC)	68 EEC (93BC) 2X	71 EEC (93BC) 2X	68 EEC (93BC) 1X REPEAT
25.56	21.42	22.80	33.40	25.77	33.48

Air Mass 1.5 Direct [illegible] 37 Deg Solar Reflectivities

37EEC (93BC) 2X	41EEC (93BC)	51EEC (93BC)	68 EEC (93BC) 2X	71 EEC (93BC) 2X	68 EEC (93BC) 1X REPEAT
27.15	22.79	23.81	34.11	26.83	34.06

<= Previous Data =>

Comparison (Different Sample/Pigment)		Comparison (same sample)	
37EEC (93BC)	27.92	68EEC (93BC)	33.84
37EEC (93BC)	28.98	68EEC (93BC)	34.44

LBL Calculator

37EEC (93BC) 2X	41EEC (93BC)	51EEC (93BC)	68 EEC (93BC) 2X	71 EEC (93BC) 2X	68 EEC (93BC) 1X
37EEC (93BC) 2X H:sol=0.25,uv=0.06,vis=0.14,nir=0.36 D:sol=0.27,uv=0.06,vis=0.15,nir=0.36	41EEC (93BC) H:sol=0.21,uv=0.05,vis=0.12,nir=0.31 D:sol=0.23,uv=0.05,vis=0.12,nir=0.31	51EEC (93BC) H:sol=0.23,uv=0.09,vis=0.16,nir=0.29 D:sol=0.24,uv=0.09,vis=0.16,nir=0.29	68 EEC (93BC) 2X H:sol=0.33,uv=0.07,vis=0.33,nir=0.36 D:sol=0.34,uv=0.07,vis=0.34,nir=0.36	71 EEC (93BC) 2X H:sol=0.26,uv=0.08,vis=0.18,nir=0.33 D:sol=0.27,uv=0.08,vis=0.18,nir=0.33	68 EEC (93BC) 1X REPEAT H:sol=0.33,uv=0.08,vis=0.34,nir=0.35 D:sol=0.34,uv=0.09,vis=0.35,nir=0.35

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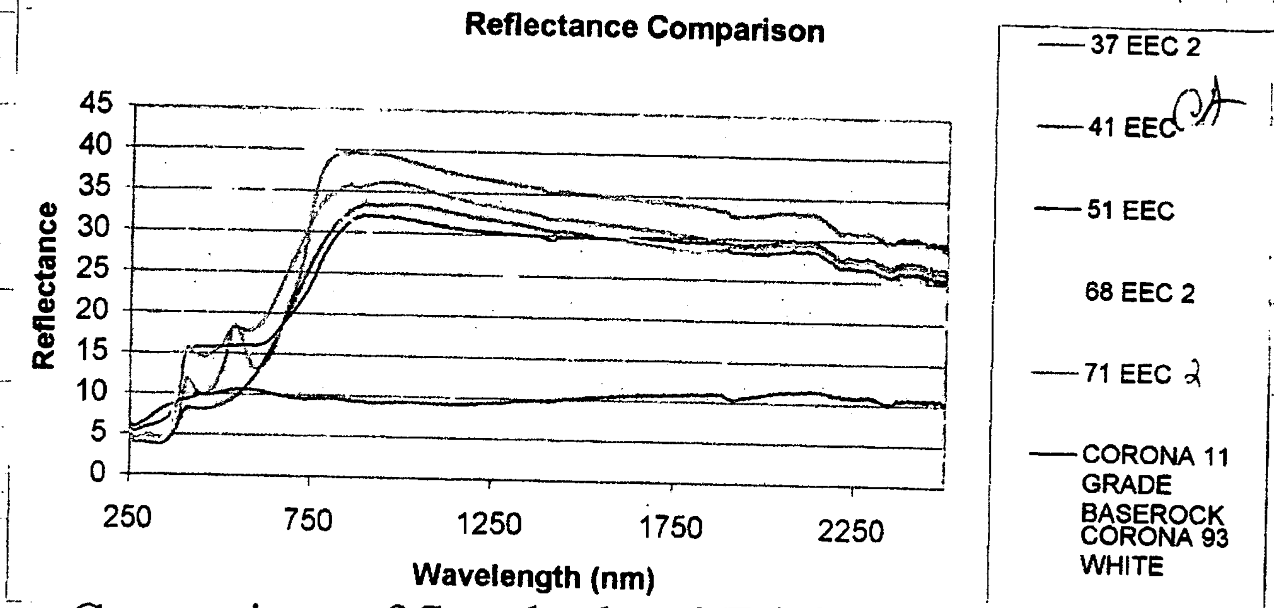
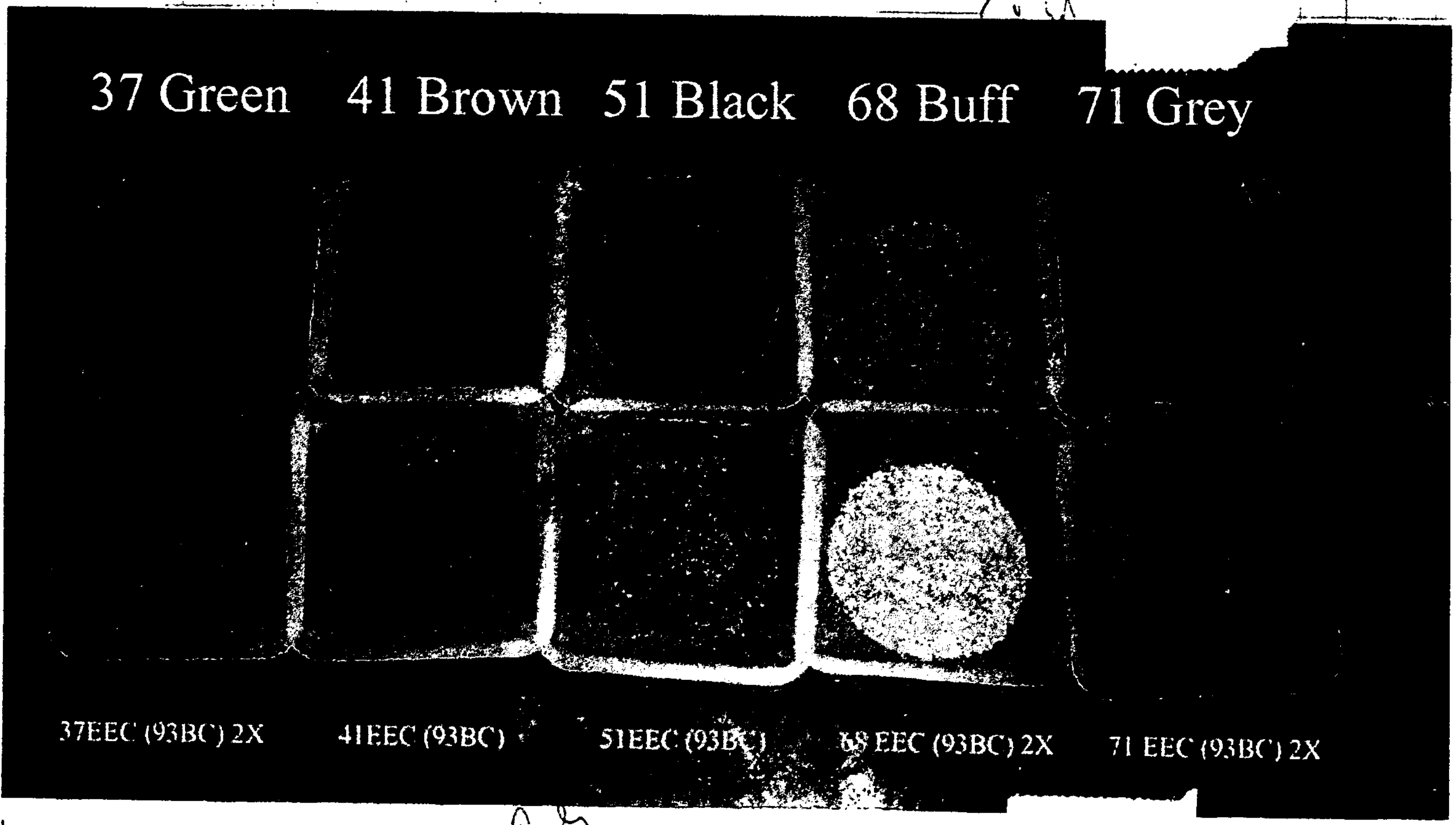


Comparison of Standard and Trial EE Granules



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